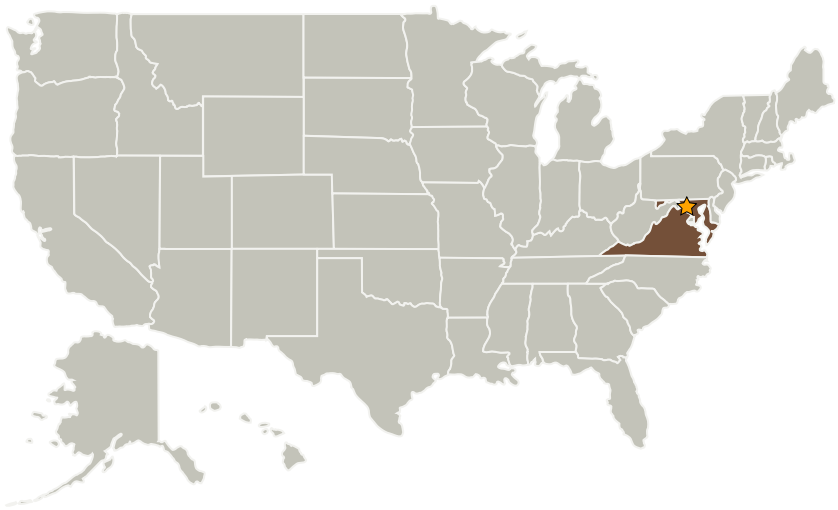
Interfacing the Paramesh Computational Libraries to the Cactus Computational Framework, Phase II

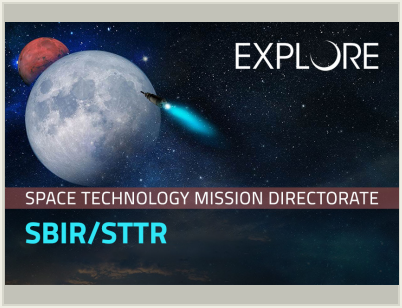
Completed Technology Project (2008 - 2010)

Project Introduction

Our proposal and the Phase I work completed under it addressed these NASA-identified needs by providing software infrastructure that provides physical scientists a "plug-and-play" architecture in which they can insert their "physics kernels" and exploit very large existing code bases for the computer science aspects of the problem. In particular, our STTR product provides cutting-edge adaptive mesh refinement (AMR) capabilities, and our Phase I results demonstrate the ability of our software architecture to run existing physics code with the newly incorporated AMR driver. Our innovative solution to the problem delivered significant value to NASA at a relatively small cost by combining existing open source tools. In Phase I, we built an interface, which we call Parca, between the Paramesh computational libraries, developed at NASA GSFC to support AMR computations in the area computational hydrodynamics, and the Cactus computational toolkit, which is an infrastructure package developed by Louisiana State University that provides a "plug-and-play" framework for cross-institution and cross-disciplinary scientific codes. Both of these software packages have large user bases in the areas of computational fluid dynamics and numerical general relativity, and both had existing users at NASA GSFC. Prior to our Phase I work, there was no way these user communities to collaborate directly, leading each user group to redevelop software already available in the other user community.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Decisive Analytics Corporation	Supporting Organization	Industry	Arlington, Virginia

Primary U.S. Work Locations	
Maryland	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.6 Robotics Integration
    - TX04.6.3 Robot Software